

491 U.S. 110  
12/23/97

PATENT APPLICATION TRANSMITTAL LETTER

Docket Number (Optional)

IKK-206

To the Commissioner of Patents and Trademarks:

Transmitted herewith for filing under 35 U.S.C. 111 and 37 CFR 1.53 is the patent application of

entitled HYPOXIC TENT SYSTEM

Enclosed are:

- ☒ 7 pages of written description, claims and abstract.  
☒ 1 sheets of drawings.  
☐ an assignment of the invention to \_\_\_\_\_  
☒ executed declaration of the inventors.  
☒ a certified copy of a Provisional (#60/055087) application.  
☐ associate power of attorney.  
☒ a verified statement to establish small entity status under 37 CFR 1.9 and 1.27.  
☐ information disclosure statement  
☐ preliminary amendment  
☐ other: \_\_\_\_\_

CLAIMS AS FILED

	NUMBER FILED	NUMBER EXTRA	RATE	FEE
BASIC FEE			\$730	\$730
TOTAL CLAIMS	20 - 20 =	*	x \$22	
DEPENDENT CLAIMS	2 - 3 =	*	x \$76	
MULTIPLE DEPENDENT CLAIM PRESENT			\$240	
NUMBER EXTRA MUST BE ZERO OR LARGER			TOTAL	\$
If applicant has small entity status under 37 CFR 1.9 and 1.27, then divide total fee by 2, and enter amount here.			SMALL ENTITY TOTAL	\$ 395.00

- ☒ A check in the amount of \$ 395.00 to cover the filing fee is enclosed.  
☐ The Commissioner is hereby authorized to charge and credit Deposit Account No. \_\_\_\_\_ as described below. I have enclosed a duplicate copy of this sheet.  
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☐ Charge the issue fee set in 37 CFR 1.18 at the mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

23 December 1997

Date

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*Application of*  
**IGOR K. KOTLIAR**

*for*

*United States Letters Patent*  
*for improvements in*

**HYPOXIC TENT SYSTEM**

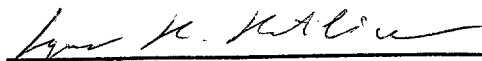
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Date of Deposit 23 December 1997

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

IGOR K. KOTLIAR  
Printed Name

  
Signature

This application is a continuation in part of patent applications 08/505,621 "Hypoxic Room System and equipment for hypoxic training and therapy," filed 21 July 1995, 08/739,379 "Hypoxic flow system for individual active and passive hypoxic training," filed 29 October 1996, and 08/797,242 "Apparatus for passive hypoxic training and therapy," filed 8 February 1997.

## FIELD OF INVENTION

This invention relates to enclosed low-oxygen environments created for resting in for the purposes of improving the cardio-pulmonary system of professional athletes, and for improving the health of any user, including the sick, injured and disabled.

The Hypoxic Tent System provides a safe low-oxygen environment at normal atmospheric pressure at simulated altitudes up to 15,000 feet or higher for sleeping in.

The benefits of the inhalation of low oxygen gas mixtures are fully described in previous patent applications 08/505,621, 08/739,379 and 08/797,242, and have recently been the focus of worldwide media attention. An athlete sleeping at a simulated altitude will increase his pulmonary ventilation and red blood cell count, and will need less oxygen to achieve the same performance level. This means his performance will improve in a normal oxygen environment. Hypoxic training may also be used in preparation for competition at high altitudes.

The invention presented here provides a convenient, low cost solution to create such an environment for sleeping. This invention makes it possible to make a portable version of the Hypoxic Room System, convenient for athletes while traveling, and may be easily installed at home or in any hotel room.

The Hypoxic Tent System can also be used as a therapeutic device to increase strength and endurance and boost immunity. The disabled can use this system for training their cardio-pulmonary systems.

## PRIOR ART

The U.S. Patent No. 5,467,764 of November 21 1995, "Hypobaric Sleeping Chamber," shows hypobaric sleeping chamber, which is used by some athletes for sleeping in for the purposes of improving pulmonary performance. This invention has significant drawbacks. Firstly, this chamber must be completely sealed, which requires rigid construction and is unsafe. Also, it has a negative psychological effect, since the user is cut off from the outside world and is confined inside a narrow tube. Further, the low pressure and dryness created inside this chamber can cause rapid dehydration, enlargement of internal organs, headaches, and irritation of the sinus and respiratory system.

## DESCRIPTION OF THE INVENTION

Figure 1 shows a schematic view of the most preferred embodiment 10. A tent 11 is fitted onto a bed 14 and upheld by supporting arches 12 and 13, which are first fastened onto the sides of a mattress 15 preferably by means of a drawstring or an elastic band (not shown). Tent 11, having a drawstring 16 with a locking device 17 at its bottom edge, is additionally tightened over the sides of mattress 15.

Tent 11 is made of light, thin fabric such as parachute nylon or synthetic material such as clear vinyl or a combination of both. The most preferred material is one which will allow the fast diffusion of moisture from tent 11. Tent 11 has an entryway 18, which can be closed preferably by a zipper, ziploc mechanism, Velcro, magnetic tape or other closing device, openable and closeable from the inside or outside of tent 11.

Supporting arches 12 and 13 are preferably made from light metal or plastic tubes which can be disassembled in segments. Arch 13 is fitted to tubing 20 on one end, is closed on the other end and has discharge nozzles 19 inside tent 11. A hypoxicator 21, described in previous patent applications, supplies low oxygen air into tent 11 through tubing 20, arch 13 and discharge nozzles 19.

Tent 11 can also have an inflatable supporting structure instead of the supporting tubing of arches 12 and 13.

A filter 22 filters the low oxygen air of airborne particles and bacteria. The most preferred type of filter is a HEPA filter, which is widely available from a number of manufacturers. An optional air cooling device 23 may be installed in the system to cool the low oxygen air for comfort. The cooling effect may also be achieved by increasing the length of tubing 20 if the ambient air outside tent 11 is already cool. For hot and humid climates, a separate air conditioning unit (not shown) may be installed instead of cooling device 23. This separate air conditioning unit would draw in air from tent 11, cool and dehumidify it and recirculate it back into tent 11. However, in most cases, excessive water vapor and carbon dioxide, much faster than other gases, will quickly diffuse through the fabric of tent 11, and will escape along with exiting air.

Hypoxicator 21 draws ambient air in and separates it into oxygen enriched and oxygen depleted fractions, employing membrane separation or pressure-swing adsorption technologies. The oxygen enriched fraction is expelled from hypoxicator 21 and the oxygen depleted fraction, having an oxygen content preferably from 11 to 15 percent, is constantly pumped into tent 11. A standard hypoxicator made by Hypoxico Inc. supplies approximately 60 liters/minute of hypoxic air with a 15% oxygen content, which corresponds to an altitude of 8,500 feet, providing the most suitable and safe environment for hypoxic training during sleep. Air pressure remains near normal inside tent 11 as a result of air exiting from naturally existing gaps in the tent construction, which does not have to be airtight. For example, air can exit around the zipper or other closing mechanism of entryway 18, as a result of the looseness of drawstring 16 and through fabric pores. Additional air escape openings may be provided as well, if necessary.

Hypoxic tent system can be easily disassembled and packed in luggage.

What is claimed is:

1. A system for providing a reduced-oxygen atmosphere for breathing to a user; said system comprising:

an oxygen-extraction device having an inlet taking in ambient air and first and second outlets, said first outlet transmitting oxygen-enriched air and said second outlet transmitting oxygen-depleted air:

a breathing chamber having an internal space therein and an entry communicating with said internal space and through which the user can enter said internal space;

said second outlet communicating with said internal space and transmitting said oxygen-depleted air to said internal space and

said first outlet transmitting said oxygen-enriched air to a location wherein it does not mix with the atmosphere in the internal space.

2. The invention according to claim 1 and said entry closable preferably by zipper, ziploc mechanism, Velcro or magnetic tape, and when closed, dividing said internal space from the external atmosphere.

3. The invention according to claim 1 and said breathing chamber made of soft synthetic or natural material and supported by supporting structure, which may be inflatable or assembled from segments made preferably from metal or plastic material.

4. The invention according to claim 1 and said breathing chamber being attached to resting platform, preferably a bed, allowing user to rest inside said internal space while inhaling oxygen-depleted air.

5. The invention according to claim 1 and said internal space communicating with the external environment through naturally existing gaps, fabric pores or optional air-escape openings, allowing excess air to escape breathing chamber and equalizing atmospheric pressure inside said breathing chamber to the outside parameter.

6. The invention according to claim 1 and said second outlet communicating with said internal space through air filter and optional air cooling device.

7. A portable travel system for providing a low-oxygen environment for a user comprising:

a breathing tent comprising soft walls supported by a supporting structure and an entry defining a closed space accessible to the user through said entry being selectively closable so that when closed, the tent is substantially isolated from the outside environment;

a gas-processing device having outlet communicating with said closed space and transmitting oxygen-depleted gas mixture through said outlet inside said closed space.

8. The invention according to claim 7 and said breathing tent designed to be attached to or erected on a resting platform, preferably mattress or bed, allowing the user to rest or sleep inside said tent.

9. The invention according to claim 7 and said portable travel system designed for quick and easy installation and disassembly at home or hotel room.

10. The invention according to claim 7 and said portable system designated for use by athletes while sleeping or resting in order to improve their cardio-pulmonary systems and performance in normal oxygen environment.

11. The invention according to claim 7 and said portable system designated for therapeutic use to increase strength and endurance and boost immunity.

12. The invention according to claim 7 and said portable system designated for use by disabled to train their cardio-pulmonary systems.

13. The invention according to claim 7 and said tent made of material allowing water vapor to diffuse through.

14. The invention according to claim 7 and said supporting structure made of metal or plastic segments.

15. The invention according to claim 7 and said supporting structure being inflatable to support said breathing tent.

16. The invention according to claim 7 and said gas-processing device employing membrane air-separation technology to provide said oxygen-depleted gas mixture.

17. The invention according to claim 7 and said gas-processing device employing pressure-swing adsorption technology to provide said oxygen-depleted gas mixture.

18. The invention according to claim 7 and said oxygen-depleted gas mixture being cleaned by HEPA filter and chilled by air cooler before entering said closed space inside said tent.

19. The invention according to claim 7 and said low-oxygen environment having oxygen content from 11% to 15% . at sea level.

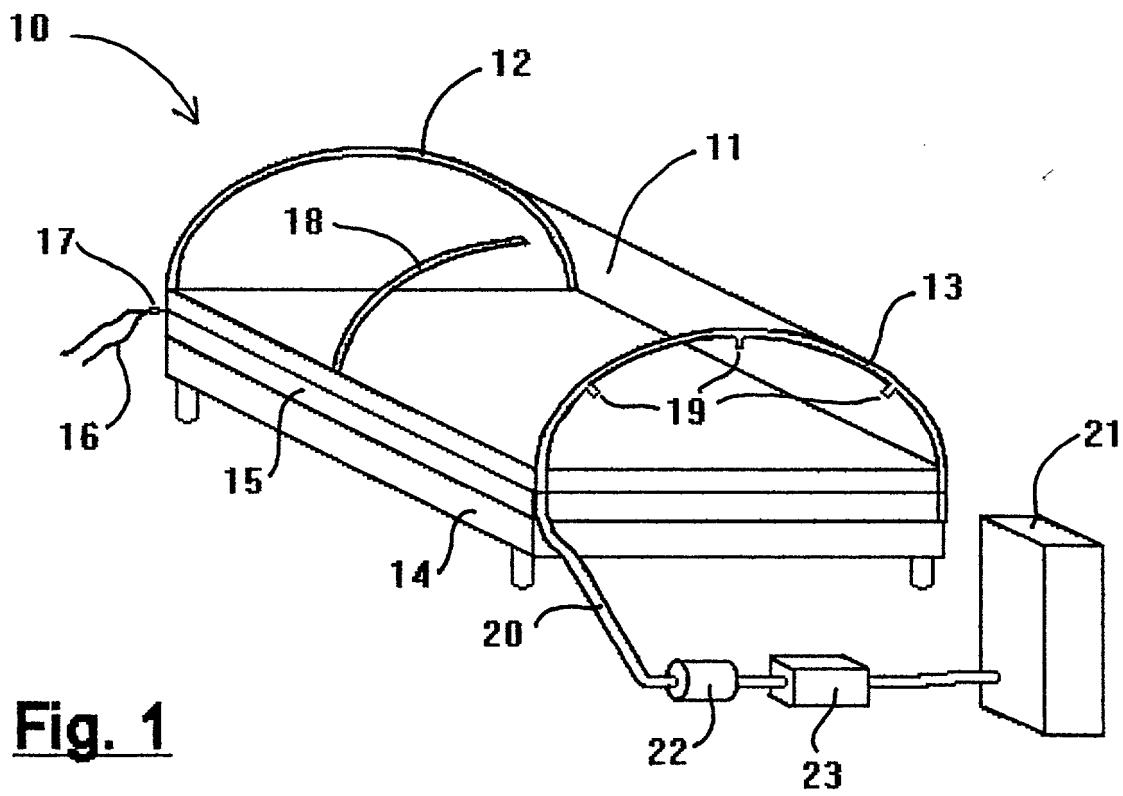
20. The invention according to claim 7 and said portable travel system which can be disassembled and packed in luggage for travel.

## Abstract

Hypoxic tent system represents a portable travel version of Hypoxic Room System and is designated mostly for passive hypoxic training of athletes during rest. The system consists of a light portable tent which can be easily erected on a bed or mattress. The tent is supported by a supporting structure which can be disassembled in segments or deflated. Oxygen-depleted air is transmitted inside the tent by hypoxicator which employs membrane separation or pressure-swing adsorption principles for extracting oxygen from ambient air. Oxygen-depleted air is also filtered by HEPA filter and may be chilled by an optional air cooler.

Hypoxic tent system can be easily packed in a travel case and installed in any hotel room by attaching to a bed.

Hypoxic tent system provides a low-oxygen environment with preferably 11 to 15% oxygen and can also be used by disabled for exercising their cardiopulmonary systems, increasing strength, endurance and boosting immunity.



# DECLARATION FOR PATENT APPLICATION

Docket Number (Optional)

IKK-206

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled  
**HYPOXIC TENT SYSTEM** the specification of which

is attached hereto unless the following box is checked

☐ was filed on \_\_\_\_\_ as United States Application Number or PCT International Application Number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Claimed

☐ Yes ☐ No

\_\_\_\_\_  
(Number) (Country) (Day/Month/Year Filed)

☐ Yes ☐ No

\_\_\_\_\_  
(Number) (Country) (Day/Month/Year Filed)

☐ Yes ☐ No

\_\_\_\_\_  
(Number) (Country) (Day/Month/Year Filed)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

08/505,621 21 July 1995 allowed

(Application Number) 29 October 1996 (Status - patented, pending, abandoned)

08/797,242 8 February 1997 pending

(Application Number) (Filing Date) (Status - patented, pending, abandoned)

60/055087 (Provisional) 24 July 1997 pending

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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NEW YORK, NY 10159-2021

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor (given name, family name) IGOR K. KOTLIAR

Inventor's signature \_\_\_\_\_ Date 23 December 1997

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Full name of second joint inventor, if any (given name, family name) \_\_\_\_\_

Second inventor's signature \_\_\_\_\_ Date \_\_\_\_\_

Residence \_\_\_\_\_ Citizenship \_\_\_\_\_

Post Office Address \_\_\_\_\_

☐ Additional inventors are being named on separately numbered sheets attached hereto.

Applicant or Patentee: Igor K. Kotliar

OMB No. 0851-0011 (12/31/86)

Serial or Patent No.: \_\_\_\_\_ Attorney's IKK-206

Filed or Issued: \_\_\_\_\_ Docket No.: \_\_\_\_\_

For: HYPOXIC TENT SYSTEM

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY  
STATUS (37 CFR 1.9 (f) and 1.27 (b)) — INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled HYPOXIC TENT SYSTEM described in

☒ the specification filed herewith

☐ application serial no. \_\_\_\_\_, filed \_\_\_\_\_

☐ patent no. \_\_\_\_\_, issued \_\_\_\_\_

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☒ no such person, concern, or organization

☐ persons, concerns or organizations listed below\*

\*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

☐ INDIVIDUAL

☐ SMALL BUSINESS CONCERN

☐ NONPROFIT ORGANIZATION

FULL NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

☐ INDIVIDUAL

☐ SMALL BUSINESS CONCERN

☐ NONPROFIT ORGANIZATION

FULL NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

☐ INDIVIDUAL

☐ SMALL BUSINESS CONCERN

☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

IGOR K. KOTLIAR

NAME OF INVENTOR

NAME OF INVENTOR

NAME OF INVENTOR

Igor K. Kotliar

Signature of Inventor

Signature of Inventor

Signature of Inventor

12/23/97

Date

Date

Date